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Title: Identification device

The invention relates to an identification device or like authenticating means. Such devices are known from practice and are used, for instance, as passports.

These known identification devices comprise at least one page on which a photograph as the image of the intended user of the identification device is positioned and secured. To this end, the photograph is placed on the page and subsequently covered with a synthetic foil which is glued both onto the photograph and the page. Prior to this, optionally a stamp can be provided over a part of the photograph and a part of the page, for further authentication. What is thereby intended is that, in order to reduce susceptibility to falsification, the photograph cannot be easily replaced with another photograph.

Research has shown that this form of protecting an identification device is not, at least not sufficiently, tamper-proof. It has been found that by carefully working and manipulating the covering foil, the foil can be detached from the page and the photograph to a sufficient extent and without causing damage, after which the photograph can be replaced and the foil put back or replaced with new foil. After this, the replacement of the photographs is not, or at least hardly, noticeable anymore.

The object of the invention is to provide an identification device of the type described in the preamble, in which the aforementioned drawbacks are avoided, while maintaining its advantages. To that end, an identification device according to the invention is characterized by the features according to claim 1.

By using a method according to the present invention, an identification device or like authenticating means, such as a passport, a driver's license, an identity card or the like can be manufactured, while at least one authenticating image, such as a portrait, a fingerprint or the like of the intended user has been provided, which cannot be removed and/or

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US 4,429,015 discloses a method for producing an identification card, in which on a flat core an image is provided, for example a photograph. Said core is subsequently heat sealed between layers of plastic laminates comprising fibers having specific orientations. When such identification means is tempered with by separating said laminates and replacing or manipulating said core and afterwards resealing said laminates, such will be directly visible due to changes in said orientation of the fibers.

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replaced with another image without damaging the identification device. With a method according to the present invention, an identification device is obtained wherein the or each image in question is provided in, at least on different layers, such that even when one of the layers is detached wholly or partly, the image in question will remain visible on both separation surfaces of the layers in question. Even when the main carrier is divided into different sublayers, the or each image will remain visible on each of the sublayers. This means that falsifications will be visible at all times, thus rendering fraud with such identification devices extremely difficult, if not impossible. Additionally, the advantage is obtained that the carrier, which is at least partly fused to the main carrier, covers the images on the outside, so that an even better protection against fraud is obtained. Preferably, the porosity of the top layer of the main carrier is then reduced, as a result of the carrier entering at least partly into said pores, thereby increasing the protection even more.

In an advantageous embodiment, a method according to the present invention is further characterized by the features according to claim 2.

Use of ink, in particular transfer ink, offers the advantage that the or each image can be applied relatively simply and moreover can be relatively easily forced into the main carrier, particularly under the influence of heat. Additionally, transfer ink has the advantageous property that it is particularly easily transferred from the carrier to the main carrier vice versa.

In a further advantageous embodiment, a method according to the present invention is moreover characterized by the features according to claim 4.

By using a main carrier having at least two layers, at least the layer facing the carrier being at least partly porous, meaning pervious to the material of the image, such as ink, the advantage is achieved that the image can penetrate relatively deeply into the main carrier and the image will be depicted on each of the layers of the carrier. Particularly when a number of porous layers are applied onto each other, protection against fraud is still

further enhanced. It is then preferred that at least one, and preferably the bottom layer, at least the layer remote from the carrier, is impervious to the material of the image, thus preventing egress of the material.

By applying different images on different layers of the main carrier, an identification device is obtained which is even more difficult to falsify.

In a method according to the present invention, the carrier and/or the main carrier are preferably heated under pressure to a temperature above 100°C, more particularly above 200°C, for obtaining the intended fusion of the carrier and the main carrier, such that a sufficient sealing action is obtained, for example 210°C. The use of materials which fuse at such high temperatures offers the advantage that separation of the layers without causing damage is rendered still more difficult.

The invention further relates to an identification device or like authenticating means, characterized by the features according to claim 11.

A device according to the present invention is provided with an authenticating image, for instance a photograph or fingerprint, being completely enveloped in the identification device in question under a transparent, at least clear top layer and in a main carrier, the image being applied in such a manner that it extends relatively deeply into at least the main carrier. Division of the main carrier into a number of sublayers therefore has as a result that a number of sublayers is obtained, each being recognizably provided with the image in question. This means therefore that fraud with such an identification device is practically impossible, since the image and the rest of the identification device cannot be separated from each other without this being relatively easily traceable.

The invention further relates to an apparatus for applying a method or manufacturing a device according to the present invention characterized by the features according to claim 14.

Such an apparatus offers the advantage that an identification device which is substantially unfalsifiable can be manufactured relatively fast and

simply. Manufacturing the identification device can be carried out substantially on-line, so that waiting periods, where necessary, can be minimized.

An identification device according to the present invention has the further advantage that it can relatively well resist all sorts of environments. Thus ,the identification device can easily be made water proof and be resistant to high temperatures, particularly when, during manufacture, use is made of plastics having a relatively high melting temperature, as described above. The closed exterior provides for a relatively high resistance to chemicals.

The invention further relates to the use of a sealing technique for manufacturing an identification device or like authenticating means, in particular for an authenticating means according to the present invention.

Further advantageous embodiments of a method or a device according to the present invention are described in the subclaims. To clarify the invention, exemplary embodiments of an identification device, method and apparatus for carrying out such a method and/or manufacturing such a device, will be further elucidated on the basis of the drawing. In the drawing:

Figure 1 shows in perspective view a carrier, provided with an image;

Fig. 2 shows in perspective, exploded view a main carrier with a carrier positioned above it;

Fig. 3 shows in perspective view an identification device according to Fig. 2, in assembled, sealed condition;

Fig. 4 shows an identification device according to Fig. 3, with layers partially broken away;

Fig. 5 shows a book-shaped identification device in opened condition, and

Fig. 6 schematically shows an apparatus for manufacturing an identification device according to the invention.

sub of 7 In this description, identical or corresponding parts have identical or corresponding reference numerals.

Fig. 1 shows in perspective view a carrier 1, with an image side facing upward. On this image side, an image 2 is provided, comprising a portrait 4 and information surfaces 6 on which further relevant information regarding a user can be included, e.g. name and address data, signature, matching the portrait 4. The image 2 is provided with the aid of a material such as paint or ink, in particular transfer ink. Transfer ink should herein be understood to include at least a type of paint or ink which, under the influence of increase of temperature and/or increase of pressure and/or moisture, can be transferred relatively easily from the carrier 1 to a main carrier 8, as will be further elucidated.

Fig. 2 shows in perspective view a carrier 1 according to Fig. 1, having its image side facing downwards, positioned over a main carrier 8, composed of a number of separate layers. The embodiment shown in Fig. 2 is provided with three layers, of which the bottom layer 10 is preferably impervious to the transfer ink used for the image, while the intermediate layers 12, 14 are at least partially porous, such that the transfer ink can pass into and through these layers, to a point close to or in the bottom layer 10. In the condition shown in Fig. 3, the carrier 1, the bottom layer 10 and the intermediate layers 12 and 14 of the main carrier 8 are pressed together and heated, such that fusion of the carrier 1 and the intermediate layers 12, 14 and the bottom layer 10, and therefore the main carrier 8, is obtained, such that an integral unit is thereby obtained. Under the influence of the pressure and the increase of the temperature up to at least partly above the melting point of the carrier 1 and/or the main carrier 8, the transfer ink and at least a part of the material of the carrier 1 are forced into and through the intermediate layers 14, 12, such that the pores 16 of the intermediate layers 12, 14 are at least partly filled with the material of carrier 1 and said transfer ink. In this manner, the image 2 is visible both in, at least through the carrier

1, which is designed in a transparent plastic material, and in the intermediate layers 12, 14, while it is preferably also depicted on the bottom layer 10. For clarification, Fig. 4 represents an identification device 3 in which parts of the carrier 1 and the intermediate layers 12, 14 have been removed, such that a stepped surface 16 is created. From the intermediate layer 12, a part of a (sub)layer has been removed, such that a first step 16A is formed, while from the intermediate layer 14 parts of two sublayers have been removed, thus forming steps 16B, 16C. Additionally, a part of the carrier 1 has been removed, thereby forming a fourth step 16D. As appears clearly from Fig. 4, the image 2 is visible through the carrier 1 yet it is also displayed on the step-surfaces 16A-16D. It is noted that a comparable image will arise if the intermediate layers 12, 14 and/or the carrier 1 were divided into still more or fewer sublayers. On each of these sublayers the image 2 will be visible.

One or more of the layers 1, 10, 12, 14 can be provided with conductive wires, preferably in the shape of a conductive grid, in particular electrically conducting, indicated in Fig. 2 with reference numeral 30. Such a conductive grid offers the advantage that it can be established in a simple manner whether the layer in question has been manipulated in an improper manner. For when this layer is damaged, the grid 30 will also be damaged. which is readily observable due to a change in conductivity. Optionally, use can here be made of magnetic fields for the detection of changes, yet other manners of detection are also possible. Further, in a simple manner, a magnetic element, a microchip or the like can be sealed into or otherwise locked in one or more of said layers.

The ink or the like which with the or each image is produced can adhere to the exterior of the fibers, but is preferably also absorbed in the fibers, as a consequence of the opening of the fibers upon heating. Especially suitable for this are e.g. polyester fibers or ramie fibers or like natural fibers. Such fibers, when heated, will obtain a somewhat open structure, so that the ink can penetrate into the fiber. After cooling, the fiber closes again, thereby

retaining the ink. This also decreases the chance of manipulation considerably.

In Fig. 5, an identification device 103 is shown, in the form of a book, e.g. a passport, in opened condition. At least one page 120 is designed in a way as shown in and as described on the basis of Figs. 1-4. The remaining pages 122 can be designed in a comparable manner, but can also be different, e.g. comparable to pages from known passports. The pages 120, 122 are preferably glued together, sealed and/or sewn together, whereby page 120 preferably extends beyond the attachment with the other pages 122, in particular forms the front and back page in order to prevent the pages 120, 122 from being relatively easily separable from each other without this being visible. On the page 120, a portrait 104, information surfaces 106, a bar code 107, a fingerprint 109 and/or a chip or like electronic means are represented or included, which are covered on the one hand by the carrier 101 and on the other hand by the main carrier 108, at least by the impervious bottom layer 110, which can, for instance, form a cover of the identification device 103. Incidentally, it will be clear that the bottom layer 110 can also be clear, at least transparent like the carrier 101, such that at least a part of the image 102 is visible from both sides of the page 120. Naturally, many variations are possible within the scope of the invention.

In an alternative embodiment, different parts of the image 2, 102 can be provided on different layers of the identification device 3, 103 prior to combining the layers in question. For instance, the portrait 4, 104 can be provided on the carrier 1, 101, a number of the information surfaces 6, 106 can be applied on one or more of the intermediate layers 12, 14 and e.g. a bar code 107 and a fingerprint 109 can be applied on the bottom layer 10, 110, in which case, through a suitable choice of temperature and/or pressure, different degrees of penetration of the different parts of the image 102 into the different layers of the identification device 3,103 can be provided for. Thus, it can be established in a still better manner whether falsification has taken place.

Fig. 6 schematically shows an apparatus 130 for manufacturing an identification device 3, 103 according to the present invention. The apparatus 130 comprises first supply means 132, e.g. a conveyor belt for supplying main carriers, and second supply means 134, e.g. also a conveyor belt, and a transport surface 136, for supplying the carrier 1, 101. Adjacent the lower end of the transport surface 136, printing means 138 are positioned for printing the image 2, 102 on the image side of the carrier 1, 101 using, for instance, transfer ink. The first and second transport means 132, 134 and the printing means 138 are controlled by a central control unit 140, e.g. a computer, such that the main carriers 8 and the carriers 1, 101 carrying a picture, are brought in the position relative to each other as shown in Fig. 2, between the positioning means 142. In the embodiment shown, the positioning means 142 are formed by portions of the conveyor belts 132, 134. Subsequently, the carriers 1, 101 and the main carriers 8 thus positioned onto each other are passed under pressure and heating means 144 in which the carrier and the underlying main carrier are heated and pressed together such that the desired, at least partial fusion of the carrier 1, 101 with the main carrier 8 is obtained, while moreover the transfer ink and hence the image 2, 102 is forced through the different intermediate layers 12, 14. The pressure and heating means 144 are also controlled by the computer 140.

In the embodiment shown, a preferably digital camera 146 is connected to the computer 140. With the aid of the camera 146 or scanner an image such as a portrait can be made and digitally registered, and through the computer 140, with the aid of the printing means 138, together with further parts of the image 1, 102, be provided, even on-line, on the carrier 1. This reduces the chance of fraud still further. For that matter, it will be clear that the information needed for the image 2, 102 can also be supplied to the printing device 138 through, for instance, a network or in another way. It is also possible that at least parts of the images 2, 102 are applied onto the carrier 1, 101 and/or the main carrier 8 prior to their being supplied to the

apparatus 130. This holds in particular for standard parts of the images 2, 102. Moreover, with the aid of the printing means 138, further authenticating means can be added, e.g. a date and time stamp corresponding to the moment of manufacture of the identification device 3, 103.

A main carrier 8 for use in the present invention is preferably composed of different layers, of which preferably at least one of the intermediate layers is designed to be at least partly porous, at least wholly or partly permeable, and manufactured, for instance, from natural or synthetic fibers, by manufacturing it using, for instance, a weaving technique or as a non-woven material such as screening silk. Here, use can moreover be made of the effect that by using synthetic fibers at least a part of the transfer ink can be taken up in the fibers in question. Upon heating the fibers, these will open partly, thereby enabling the transfer ink to be absorbed. Upon cooling, the fibers will close again, thus enclosing the transfer ink. This makes falsification of the authenticating means still more difficult.

The invention is not limited in any way to the exemplary embodiments represented in the description and the Figures. Many variations are possible within the scope of the invention as outlined by the claims.

Further authenticating means can be incorporated in an identification device according to the present invention, for instance electronically or magnetically detectable means, holograms and the like. Further, specific weaving techniques and fabric textures can be used for at least one of the layers. The heating means can be provided with plate parts having a relief which, when heated, is pressed into one or more of the layers. Furthermore, different layers can have different colors. Preferably, colors are used which flow at least partly, when heated, and more specifically flow together. Several pages of an identification device according to the present invention can be composed as described with reference to Figs. 1 - 4. After being thus formed, pages can also be printed or stamped. Other images for the identification of a user can be incorporated in an identification device

according to the present invention, e.g. images. The carrier 1, 101 can be made of such material that during the forming of the identification device, particularly upon heating, this material disappears partly or wholly while the image 2, 12 is incorporated in the main carrier 8. This is particularly advantageous when a non-transparent, or at least insufficiently transparent carrier is used. Furthermore, other techniques can be used for applying the images, e.g. printing techniques. These and many comparable variations are deemed to fall within the scope of the invention.